

## ABSTRACT OF THE DISCLOSURE

The invention provides a method and system for lookup of message header information that has the advantages of low-power, speed, and flexibility. The invention uses a sequence of pipelined on-chip memories, each having only a portion of the header information intended for lookup. Each one of the on-chip memories simultaneously performs a lookup on a portion of the header information, allowing embodiments of the invention to operate on multiple messages worth of header information substantially simultaneously. The invention uses a novel data structure for recording destination addresses in the sequence of on-chip memories, having the property that moving information about destination addresses, or otherwise responding to changes in network topology is flexible, while at the same time maintaining relatively dense usage of the on-chip memories. The novel data structure allows embodiments of the invention to find the longest match destination address with no substantial additional processing over random-access memory lookup.